

Trend Study 27-8-03

Study site name: Fivemile Mountain.

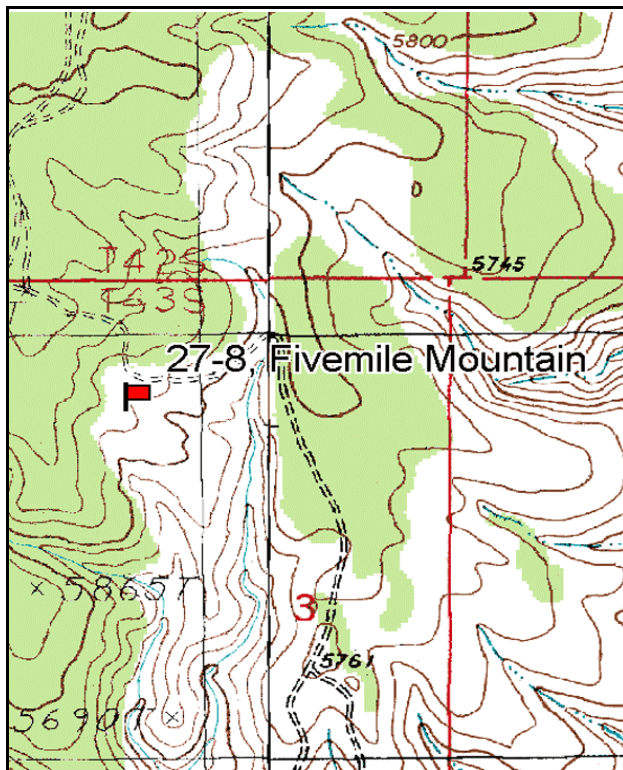
Vegetation type: Black Sagebrush.

Compass bearing: frequency baseline 125 degrees magnetic.

Frequency belt placement: line 1 (11 & 71ft), line 2 (34ft), line 3 (59ft), line 4 (95ft).

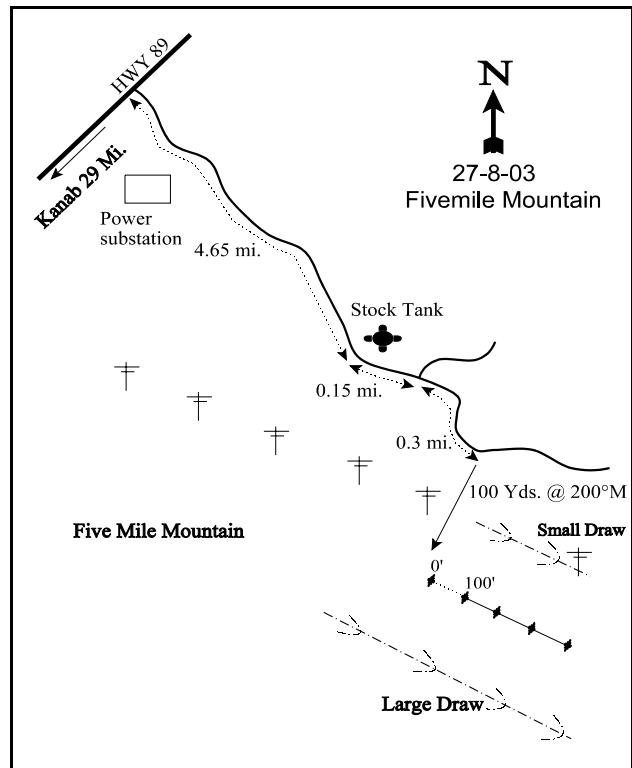
LOCATION DESCRIPTION

From the 90° turn in US 89 in the center of Kanab, go 29.0 miles south on US 89 to the turnoff to Fivemile Mountain. Turn right (southeast) and travel 4.6 miles on the graded road (BLM Rd #710) to a stock tank. Continue on a dirt road 0.15 miles to a fork, bear right. Continue up and over the mountain for 0.3 miles to a bend in the road. Stop here and walk about 100 yards south to the crest of a small ridge and the 0-foot baseline stake. The study runs E-SE down the ridge.



Map Name: Buckskin Mountain

Township 43S, Range 2W, Section 3



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4106822 N, 410840 E

DISCUSSION

Fivemile Mountain - Trend Study No. 27-8

This study is located on the south slope of Fivemile Mountain, a low plateau that is important for mule deer during severe winters when they drop off of the Vermillion Cliffs. The range type is black sagebrush interspersed with juniper. The transect runs down an east-southeast facing ridge with a slope of approximately 7%. Elevation at the site is 5,850 feet. Moderate numbers of deer pellet groups are usually encountered as indicated by quadrat frequency values for deer in 1997 (28%) and 2003 (26%). Pellet group transect data was also collected on site in 2003 and estimated 27 deer and 5 cow days use/acre (66 ddu/ha and 13 cdu/ha).

Besides low precipitation, the limiting factor for vegetation on this site is the shallow rocky soils. Effective rooting depth was estimated at almost 11 inches, but there is a high percentage of rock fragments in all horizons. Soil texture is a sandy clay loam with a neutral pH (7.2). Due to the rocky nature of the soil, average soil temperature was high in 1997 and 2003 at nearly 75°F (8 inches in depth). Past soil loss has left a layer of erosion pavement over most of the exposed surface, but erosion is minimal at the present time. An erosion condition class assessment resulted in a stable rating for soils in 2003. Vegetation and litter cover are fairly abundant, and bare ground has been moderately low (8%-12%) in all surveys.

The dominant browse species is black sagebrush which has accounted for more than 3/4 of the browse cover since 1992. Density estimates increased between 1987 and 1992, primarily due to the much larger sample used beginning in the 1992 field season. The black sagebrush population was estimated at 5,980 plants/acre in 1992, decreasing to 4,420 in 1997 and 5,260 in 2003. Utilization was moderate to heavy on 48% of the sagebrush sampled in 1987, but more light to moderate in all other samples. From 1987-1997, black sagebrush displayed generally good vigor and percent decadence was stable at around 30%. In 2003, poor vigor increased to 30% of the population, and percent decadence was estimated at 61%. A high number of dead plants were counted in both 1997 and 2003, suggesting a rather rapid turnover of black sagebrush. A further concern is that a high proportion of the decadent age class was classified as dying in 1997 (43%) and 2003 (49%), which is often considered an irreversible condition. With low recruitment from young plants in both 1997 and 2003 (2%), it appears that black sagebrush will decline on this site in the future. Increases in decadence and poor vigor as well as low reproduction can be attributed primarily to the dry conditions experienced prior to and including the 2003 survey. Annual leaders averaged less than 1 inch of new growth when the site was read in early August of 2003.

If it was more common, Stansbury cliffrose could be a key browse species. Scattered large plants are found west of the study site. These shrubs average 10 feet in height and have been hedged, but not severely. There are occasional seedling and young plants along the ridge. Junipers on the site exhibit the harshness of the growing conditions by their stunted, twisted forms. Some individuals are highlined. Point-center quarter data collected in 2003 estimated 42 juniper trees/acre on the site. There are a few young pinyon scattered around as well. The other most common shrubs are the increasers broom snakeweed and low rabbitbrush. Both species showed decreased densities in 2003.

The herbaceous understory is poor and dominated by cheatgrass which has significantly increased in nested frequency since 1992. Cheatgrass accounted for 49% of the grass cover in 1997, increasing to 66% in 2003. Even with dry conditions in 2003, cheatgrass cover nearly tripled from 2.4% to 6.6%. Perennial species are infrequent and have a lower combined sum of nested frequency value than cheatgrass. Perennial grasses that have been sampled include blue grama, needle-and-thread, Sandberg bluegrass, Indian ricegrass, and bottlebrush squirreltail. Perennial forbs are very rare in all surveys. Storksbill, an annual, was the most abundant forb species sampled in 2003.

1992 TREND ASSESSMENT

The soils on this site are shallow and very rocky. Surface rock-pavement is very common with a high cover value of 45%. Percent bare soil is now estimated at 8%. Trend for soil appears stable but in very poor condition. The trend for browse is stable. Black sagebrush has a moderately large population with a fairly good biotic potential and young age class of plants. Percent decadence has also decreased somewhat for this population. The trend for the herbaceous understory is slightly up. There was a slight increase in nested frequency values for the perennial grasses and forbs, but it is still in very poor condition.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - slightly up (4)

1997 TREND ASSESSMENT

Trend for soil is slightly down due to an increase in percent bare soil and a decline in vegetation cover. Percent pavement and rock cover declined from 45% to 37% which would suggest some overland soil movement. On the positive side from a watershed standpoint, sum of nested frequency of grasses increased. However, this improvement comes primarily from a significant increase in the nested frequency value for cheatgrass. Trend for black sagebrush is down. Population density has declined 26% since 1992, along with a slight increase in moderate to heavy use, an increase in plants showing poor vigor, and an increase in percent decadence from 24% to 31%. The percentage of decadent plants classified as dying has steadily increased since 1987 when it was 25%. It is currently up to 43%, meaning that an additional 584 plants/acre could soon be classified with the dead plants, raising the percentage of dead plants from 19% to 27%. Recruitment is currently not adequate to replace the decadent/dying plants, indicating a continued decline in density unless more favorable conditions for seedling establishment return to the area. Trend for the herbaceous understory is mixed. Sum of nested frequency of perennial grasses has remained similar to 1992 levels, while sum of nested frequency of forbs has declined. Since forbs are rare, trend is considered stable for the herbaceous understory. However, composition and abundance is poor.

TREND ASSESSMENT

soil - down slightly (2)

browse - down (1)

herbaceous understory - stable (3)

2003 TREND ASSESSMENT

Trend for soil is stable. Soil surface characteristics are similar to 1997 estimates including stable bare ground and litter cover estimates. Vegetation cover slightly increased in 2003 with most coming from the increase in cheatgrass cover. Erosion remains low. Trend for browse is down. Although the population density estimate for black sagebrush is slightly higher than in 1997, most of the key population parameters show negative changes. The most notable changes are the increase in percent decadence (31% to 61%), increase in the proportion of the population showing poor vigor (13% to 30%), and the proportion of the decadent age class classified as dying (49%, ~1,560 plants/acre). Recruitment from young plants remains very low at 2%, and far below the level needed to replace the decadent and dying individuals in the population. The number of dead sagebrush plants also increased in 2003. Trend for the herbaceous understory is also down. Sum of nested frequency values for perennial grasses and forbs have declined by nearly 50% since 1997. Cheatgrass continues to dominate the site and shows increases in both frequency and cover in 2003. The negative trends for black sagebrush and declining number of perennial grasses and forbs can be attributed to drier precipitation patterns prior to and including the 2003 survey.

TREND ASSESSMENT

soil - stable (3)

browse - down (1)

herbaceous understory - down (1)

HERBACEOUS TRENDS --

Management unit 27 , Study no: 8

T y p e	Species	Nested Frequency				Average Cover %		
		'87	'92	'97	'03	'92	'97	'03
G	<i>Bouteloua gracilis</i>	_a 15	_b 42	_b 42	_b 40	1.25	.91	1.39
G	<i>Bromus tectorum</i> (a)	-	_a 18	_b 180	_b 202	.07	2.44	6.59
G	<i>Hilaria jamesii</i>	-	3	-	3	.03	-	.15
G	<i>Oryzopsis hymenoides</i>	_{ab} 12	_c 38	_{bc} 31	_a 10	.51	.21	.16
G	<i>Poa fendleriana</i>	-	3	3	3	.03	.00	.00
G	<i>Poa secunda</i>	_a -	_b 14	_c 35	_{ab} 6	.08	.40	.06
G	<i>Sitanion hystrix</i>	_b 51	_a 22	_a 15	_a 2	.15	.41	.03
G	<i>Stipa comata</i>	48	25	40	32	.39	.28	.47
G	<i>Stipa speciosa</i>	-	1	4	5	.00	.15	.15
G	<i>Vulpia octoflora</i> (a)	-	_b 107	_a 58	_b 104	.34	.12	.96
Total for Annual Grasses		0	125	238	306	0.41	2.56	7.55
Total for Perennial Grasses		126	148	170	101	2.46	2.38	2.42
Total for Grasses		126	273	408	407	2.87	4.95	9.98
F	<i>Alyssum alyssoides</i> (a)	-	_a -	_a -	_b 15	-	-	.06
F	<i>Astragalus</i> spp.	_b 13	_c 40	_b 20	_a -	.12	.07	-
F	<i>Calochortus nuttallii</i>	-	9	3	1	.02	.01	.00
F	<i>Collinsia parviflora</i> (a)	-	-	2	5	-	.00	.01
F	Cruciferae	-	6	-	-	.04	-	-
F	<i>Descurainia pinnata</i> (a)	-	8	4	10	.02	.01	.05
F	<i>Draba cuneifolia</i> (a)	-	_b 19	_a -	_{ab} 8	.09	-	.02
F	<i>Eriogonum cernuum</i> (a)	-	2	1	-	.03	.00	-
F	<i>Erodium cicutarium</i> (a)	-	_a -	_a 12	_b 31	-	.19	1.74
F	<i>Erigeron pumilus</i>	_c 23	_{ab} 2	_{bc} 13	_a -	.03	.02	-
F	<i>Gilia inconspicua</i> (a)	-	_c 139	_a 16	_b 57	.48	.03	1.11
F	<i>Lappula occidentalis</i> (a)	-	_b 146	_a 6	_a -	.48	.01	-
F	<i>Lomatium</i> spp.	-	5	1	-	.03	.03	-
F	<i>Mentzelia</i> spp.	_a -	_a -	_a -	_b 14	-	-	1.01
F	<i>Penstemon thompsoniae</i>	-	1	1	-	.03	.00	-
F	<i>Phlox longifolia</i>	_a 3	_b 25	_{ab} 15	_a 5	.25	.06	.06
F	<i>Sphaeralcea grossulariaefolia</i>	-	3	-	-	.00	-	.01
F	Unknown forb-annual (a)	-	5	-	-	.01	-	-

Type	Species	Nested Frequency				Average Cover %		
		'87	'92	'97	'03	'92	'97	'03
F	Zigadenus paniculatus	-	1	-	-	.00	-	-
Total for Annual Forbs		0	319	41	126	1.11	0.25	3.00
Total for Perennial Forbs		39	92	53	20	0.54	0.21	1.09
Total for Forbs		39	411	94	146	1.65	0.46	4.09

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 27 , Study no: 8

Type	Species	Strip Frequency			Average Cover %		
		'92	'97	'03	'92	'97	'03
B	Artemisia nova	86	79	80	22.60	13.00	12.19
B	Ceratoides lanata	1	2	2	-	-	-
B	Chrysothamnus viscidiflorus stenophyllus	25	20	21	2.09	1.18	.72
B	Gutierrezia sarothrae	4	8	6	.19	.01	.33
B	Juniperus osteosperma	2	2	2	2.49	-	1.92
B	Opuntia spp.	1	2	5	-	.38	.38
B	Sclerocactus	5	3	5	.18	.15	.06
Total for Browse		124	116	121	27.55	14.72	15.61

CANOPY COVER, LINE INTERCEPT --

Management unit 27 , Study no: 8

Species	Percent Cover	
	'97	'03
Artemisia nova	-	14.50
Chrysothamnus viscidiflorus stenophyllus	-	.63
Juniperus osteosperma	3.00	2.56
Opuntia spp.	-	.03
Sclerocactus	-	.05

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 27 , Study no: 8

Species	Average leader growth (in)
	'03
Artemisia nova	0.9

POINT-QUARTER TREE DATA --

Management unit 27 , Study no: 8

Species	Trees per Acre	Average diameter (in)
	'03	'03
Juniperus osteosperma	42	9.0

BASIC COVER --

Management unit 27 , Study no: 8

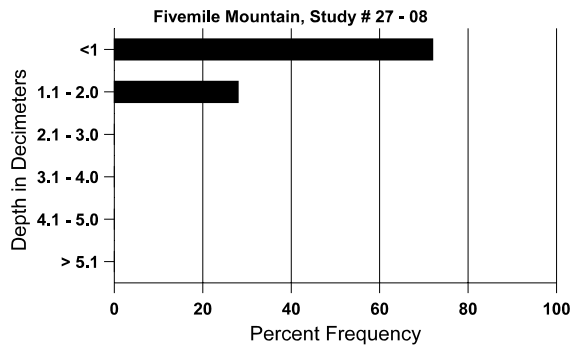
Cover Type	Average Cover %			
	'87	'92	'97	'03
Vegetation	2.75	30.85	23.60	30.53
Rock	19.50	44.86	18.30	21.68
Pavement	28.00	0	18.18	21.40
Litter	36.00	29.56	28.00	26.07
Cryptogams	5.25	1.31	2.51	.76
Bare Ground	8.50	8.08	12.39	11.49

SOIL ANALYSIS DATA --

Management unit 27, Study no: 8, Study Name: Fivemile Mountain

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
10.7	74.0 (10.0)	7.2	58.4	19.1	22.6	2.1	16.0	115.2	0.7

Stoniness Index



PELLET GROUP DATA --

Management unit 27 , Study no: 8

Type	Quadrat Frequency			Days use per acre (ha)
	'92	'97	'03	
Rabbit	8	9	8	-
Deer	16	28	26	27 (66)
Cattle	-	2	2	5 (13)

BROWSE CHARACTERISTICS --

Management unit 27 , Study no: 8

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<i>Artemisia nova</i>											
87	2532	133	66	1666	800	-	37	11	32	16	12/20
92	5980	160	740	3800	1440	-	22	0	24	9	-/-
97	4420	100	80	2980	1360	1040	32	2	31	13	16/28
03	5260	-	80	1980	3200	1480	6	0	61	30	13/23
<i>Ceratoides lanata</i>											
87	0	-	-	-	-	-	0	0	-	0	-/-
92	20	20	-	20	-	-	0	0	-	0	-/-
97	40	-	-	40	-	-	0	0	-	0	9/7
03	40	-	-	40	-	-	50	0	-	0	11/8
<i>Chrysothamnus viscidiflorus stenophyllus</i>											
87	933	-	-	533	400	-	0	0	43	43	10/9
92	780	-	40	640	100	-	0	0	13	10	-/-
97	660	-	20	420	220	40	0	0	33	9	11/21
03	560	-	-	300	260	-	0	0	46	29	12/22
<i>Cowania mexicana stansburiana</i>											
87	0	66	-	-	-	-	0	0	-	0	-/-
92	0	-	-	-	-	-	0	0	-	0	-/-
97	0	-	-	-	-	-	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	78/101
<i>Gutierrezia sarothrae</i>											
87	1198	400	66	1066	66	-	0	0	6	6	7/7
92	100	80	-	100	-	-	0	0	0	0	-/-
97	220	-	-	180	40	80	0	0	18	0	7/7
03	140	-	-	140	-	20	0	0	0	0	7/7

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Juniperus osteosperma											
87	66	-	-	-	66	-	0	0	100	0	-/-
92	40	-	20	20	-	-	0	0	0	0	-/-
97	40	-	20	20	-	20	0	0	0	0	-/-
03	40	-	-	40	-	20	0	0	0	0	-/-
Opuntia spp.											
87	0	-	-	-	-	-	0	0	-	0	-/-
92	20	-	-	20	-	-	0	0	-	0	-/-
97	60	-	-	60	-	-	0	0	-	0	9/27
03	100	-	20	80	-	-	0	0	-	0	10/23
Sclerocactus											
87	0	66	-	-	-	-	0	0	0	0	-/-
92	100	-	40	40	20	-	0	0	20	20	-/-
97	60	-	20	40	-	-	0	0	0	0	5/8
03	100	-	20	40	40	-	0	0	40	40	4/5
Yucca spp.											
87	0	-	-	-	-	-	0	0	-	0	-/-
92	0	-	-	-	-	-	0	0	-	0	-/-
97	0	-	-	-	-	-	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	19/25